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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/240,632	02/01/1999	YUTAKA MURAKAMI	402/568	7584

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EXAMINER

FAN, CHIEH M

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 01/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/240,632

Applicant(s)

MURAKAMI ET AL.



Examiner

Chieh M Fan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 19-35 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 1/30/98 and 2/26/98. It is noted, however, that applicant has not filed a certified copy of the foreign application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 14-16 and 30-32 are rejected under 35 U.S.C. 112, first paragraph, because these claims are not, as written, supported by or consistent with the written description.

In particular, the limitations recited in claims 14-16 and 30-32 are exactly opposite to the teaching of the specification (see for example, page 52, lines 14-16, page 54, lines 11-15, and page 55, lines 1-3).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 5, 7, 25 and 33-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya (US Patent 5,577,087).

Regarding claims 1 and 33, Furuya discloses a variable modulation communication method comprising the steps of:

periodically and alternately (60 and 30 in Fig. 4; also see Fig. 2 and col. 3, lines 3-6, the blocks numbered 1, 2 of a signal frame are using QPSK and the blocks numbered 3, 4 are using 16QAM) subjecting an input digital signal (input to 70 in Fig. 4) to first modulation (40 in Fig. 4) and second modulation (50 in Fig. 4) to convert the input signal into pair of a baseband I signal and a baseband Q signal (note that the outputs of 16QAM and QPSK have I and Q components), the first modulation and the second modulation being different from each other; and

outputting the pair of the baseband I signal and the baseband Q signal (the outputs of 40 and 50 are sent to radio section 20 for converting to radio frequency and then sent to the antenna 10 for transmitting).

Regarding claims 2 and 3, the first modulation is 16QAM which meets the limitation of "at least 8-signal-point modulation), and the second modulation is QPSK.

Regarding claim 5, the first modulation is 16QAM, which meets the limitation of "at least 8QAM).

Regarding claim 7, the first modulation is 16QAM.

Regarding claim 25, the first modulation is 16QAM and the second modulation is QPSK.

Regarding claims 34 and 35, the block diagram shown Fig. 4 of Furuya is a transceiver that performs both transmitting and receiving. Therefore, the limitations associated with the receiving part as recited in claims 34 and 35 are met by reversing the rationale applied to the transmitting steps in claims 1 and 33 described above.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4, 6, 8-12, 14-16, 26-28 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya as applied to claims 1, 2, 5, 7, 25 and 33-35 above.

Regarding claims 4, 9-12 and 26-28, as described above, Furuya teaches all the subject matter of the claimed limitation except rotating the signal points by an angle of $\pi/4$. However, the claimed limitation of rotating the signal points by an angle of $\pi/4$ is simply a design choice. The rotation of constellation by an angle would not change the relationship between signal points. As long as the receiving end knows the rotation angle, the demodulation procedure would be the same.

Regarding claims 6 and 8, the first modulation of Furuya is 16QAM.

Regarding claims 14-16 and 30-32, Furuya does not teach a distance between signal points of the 16 QAM in an I-Q plane is equal to a given value (such as 2 or in a range of 0.9-1.5) times a distance between signal points of the PSK in the I-Q plane. However, it is clear the distance between signal points of the 16QAM or QPSK in the I-Q plane in the system of Furuya is merely an arbitrary design choice, dictated by system conditions such as how noisy the system is. When there is more noise, the distance between signal points would need to be wider to reduce error.

8. Claims 13 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya as applied to claims 1, 2, 5, 7, 25 and 33-35 above, and further in view of Marchetto et al. (US Patent 5,914,959).

As described above, Furuya teaches all the subject matter of the claimed limitation except the maximum amplitude corresponding to signal points of the at least 8-signal-point modulation in an I-Q plane is equal to an amplitude of a signal point of the phase shift keying in the I-Q plane.

Marchetto et al. discloses a communication system wherein the input signal is modulated by either 16QAM or QPSK modulation. The corner points of the 16QAM constellation are being used as the symbols of the QPSK constellation pattern (the maximum amplitude corresponding to signal points of the 16QAM in an I-Q plane is thus equal to an amplitude of a signal point of QPSK in the I-Q plane), such that the operation of receiver front end is not affected by the change of the modulation scheme (see col. 4, lines 42-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the feature that the maximum amplitude corresponding to signal points of the at least 8-signal-point modulation in an I-Q plane is equal to an amplitude of a signal point of the phase shift keying in the I-Q plane into the system of Furuya, such that the operation of receiver front end is not affected by the change of the modulation scheme (thereby simplify the complexity of the receiver).

9. Claims 17 and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya as applied to claims 1, 2, 5, 7, 25 and 33-35 above, and further in view of Wong (US Patent 5,027,372).

Regarding claim 17, Furuya teaches all the subject matter of the claimed limitation except that the PSK modulation is differential phase shift keying (DPSK). However, DPSK is a well-known variation of basic PSK modulation technique. It has been long practiced in the art. Wong teaches that the use of DPSK instead of PSK would have the advantage of not needing to transmit a phase reference (col. 2, lines 25-

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26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use DPSK instead of PSK in the system of Furuya, such that a reference phase is not required.

Regarding claims 19 and 20, the first modulation is 16QAM.

Regarding claim 23, the second modulation is QPSK.

Regarding claims 21, 22 and 24, the claimed limitation of rotating the signal points by an angle of $\pi/4$ is simply a design choice. The rotation of constellation by an angle would not change the relationship between signal points. As long as the receiving end knows the rotation angle, the demodulating procedure would be the same.

Allowable Subject Matter

10. Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Frodigh et al. (US Patent 5,909,469) and Hieatt, III (US Patent 5,535,215).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (703) 305-0198. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Chieh M Fan
Examiner
Art Unit 2634

cmf
December 20, 2001



STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Attachment for PTO-948 (Rev. 03/01, or earlier)
6/18/01

The below text replaces the pre-printed text under the heading, "Information on How to Effect Drawing Changes," on the back of the PTO-948 (Rev. 03/01, or earlier) form.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

1. Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes **incorporated** therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the Notice of Allowability. Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136(a) or (b) for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

Applicant is required to submit the drawing corrections within the time period set in the attached Office communication. See 37 CFR 1.85(a).

Failure to take corrective action within the set period will result in **ABANDONMENT** of the application.